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AGILENT TECHNOLOGIES
Legal Department, 51U-PD
Intellectual Property Administration
P.O. Box 58043
Santa Clara, CA 95052-8043

EXAMINER	
GORDON, BRIAN R	

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/771,092
Filing Date: January 26, 2001
Appellant(s): FISHER, WILLIAM D.

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GROUP 1700

Bret Field
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed September 7, 2005 appealing from the Office action mailed June 9, 2005.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

5,023,625	Bares et al.	6-1991
6,045759	Ford et al.	4-2000

6,872,359	Caren et al.	3-2005
6,603,118	Ellson et a.	8-2003

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-14 and 35-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bares et al. US 5,023,625 in view of Ford et al. US 6,045,759.

Bares et al. discloses an invention to overcome the inability of the natural ink feed capillary action to adequately supply ink to a ink jet printhead during high frequency operation (pulse jet operation) and thereby extend F_{max} beyond its present limits.

The device comprises a resistive heater element 11 (thermoelectric transducer) that is aligned with respect to an orifice plate, and an ink flow path supplies ink into a chamber or reservoir between the resistive heater element and the orifice plate. This improved system includes, among other things: 1) a piezoelectric system which is mounted internal to the ink cavity of an ink jet printhead; 2) an external piezoelectric system which is mounted directly on the orifice plate of an ink jet printhead; 3) dual independent piezoelectric systems which are both mounted internal to the ink cavity of the printhead; and 4) dual piezoelectric systems with one being internal to the ink cavity

of the printhead and the other being external and mounted directly on the orifice plate of the printhead. The above described ink feed systems may be used to: 1) produce oscillations of controlled frequency, Fm, and controlled amplitude, Im, of the ink meniscus at the ink ejection orifice and produce the ejection of ink drops from a single orifice with varying and controlled volumes; 2) extend the maximum frequency of operation, F_{max}, of the ink jet printhead; and 3) extend the viscosity range of inks which may be used.

In accordance with the invention, a piezoelectric material 22 such as quartz or barium titanate crystals or a kynar piezoelectric film is introduced into the ink cavity 14 as shown in FIG. 5, or is mounted externally on the outer surface of the orifice plate 16 as shown in FIG. 6. The material 22 is connected in such a manner that it can be energized with a controlled electrical signal, and this signal induces oscillations, of controlled frequency and magnitude, within the material 22. This action in turn produces a positive ink pressure within the ink cavity 14 and the ink channel 13 and thereby behaves as an ink pump. Both **internally** and externally mounted piezoelectric systems function in an equivalent manner.

The timing of the firing of resistor 11 with respect to the meniscus amplitude, Im, of the induced meniscus oscillations is crucial. If the resistor 11 is fired at the equilibrium position, or points (T) in FIG. 4B, the ink jet printhead is operating in the "equilibrium mode" and medium volume ink drops, Veq, are ejected. These ejected ink drops are of a volume equal to the case where the piezoelectric material is not pulsed.

The range of ejected ink drop volume may be extended by employing dual independently controlled piezoelectric systems within an ink jet printhead. FIG. 7 illustrates such a system where both independently controlled piezoelectric drivers 22 are incorporated within the ink cavity 14.

Bares et al. does not mention striking the dispenser in order to remove air bubbles.

Ford et al. discloses a method and apparatus for dispensing biological materials (DNA). In the processing of a biological reaction system, there is a need for consistently placing an amount of fluid on a slide. In order to accomplish this, several methods are used including a consistency pulse and a volume adjust means. Moreover, in order to reliably operate an automated biological reaction system, the dispenser must be reliable, easy to assemble and accurate (abstract).

To ensure accurate dispensing the system may be primed. Ford teaches to check for a good prime, the customer may flip the dispenser upside-down, tap the dispenser, dislodging any trapped air then pressing down on the barrel slowly to move the air bubble past the ball seat. The customer may then flip the coupler right-side-up and release the barrel. Good priming occurs with approximately one drop of waste (column 27, lines 1-6).

As to claims 5-8, Bares in view of Ford et al. does not specifically recite a particular strike rate or the amount of energy delivered by each strike.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the modified method of Bares by applying the appropriate strike rate

and energy to remove the air bubbles as found necessary by the operator to increase the efficiency and accuracy of the modified device.

As to claims 13-14 and 41-42, Ford discloses dispensing biological materials.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Bares et al. by employing the teachings of Ford et al. and striking or tapping the syringe to remove bubbles in order to provide for accurate and precise dispensing of fluids.

(10) Response to Argument

As to Group I, claims 1, 9-10, and 37 appellant states the references of Bares and Ford are from non-analogous art. As previously stated in the Advisory Action the examiner maintains the references are analogous for the references are in the same field of dispensing. Futhermore, the Patent Office often times cross classify injet/pulse jet apparatuses and methods within the field of the liquid transfer (as has been done in the instant case). The applied art is recognized as analgous art by the Patent Office classification system. The claims read in the broadest reasonable interpretation recite a fluid transfer/dispensing method. As to the particular problems, the examiner asserts the Ford reference addresses a well-known problem associated with any conventional type of dispensing, the adverse affects on dispensing which derive from the developmet of air bubbles in a dispensing system/process. Appellant's specification (at page 2, last paragraph) discloses that this is the purpose of the of the striking/tapping. As such, the examiner asserts the combined teachings of the references do address this common problem.

Appellant also states the field of appellant's invention is the employment of pulse-jet for microarray fabrication. Claims 1, 9-10, and 37 are silent as to the microarray fabrication. However, microarray fabrication is well known in the art and the employment of numerous types of dispensers including inkjet, pulse-jet, thermoelectric, piezoelectric, plunger, syringe, etc. are conventionally known as being means to dispense the fluid to fabricate such arrays (as evidenced by for example, Caren et al., US 6,872,359; Ellson et al. US 6,603,118).

The ability of the device to dispense a specific volume of liquid is not specified in the claims (not an issue of patentability), but it is argued by appellant. The examiner asserts the device of Ford operates by applying a pulse to the system and the dispensed volume may be adjusted to control the volume to the level of microliters (see for example, column 19, lines 40-44).

Appellant further argues the concept of when and how dispensing occurs from such a device. The claims do not specify how nor when dispensing occurs within this method. Therefore, such an argument is not commensurate in scope with the claims. However, it should be noted earlier in the prosecution the examiner invited appellant to clarify how and when the dispensing occurs (see Office action 2/23/04). Appellant chose not to specify or clarify such an action.

In response to appellant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208

USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

The examiner submits that the references are analogous and furthermore for the reasons given above the combination of references have been properly applied.

As to Group II, claims 2, 3, and 38, appellant asserts that intermittently striking of the plusejet is reason for patentability over the combined references. The examiner disagrees, for, as admitted by appellant (specification, page 2 last paragraph), tapping a dispenser is commonly and conventionally known for removing bubbles. It is so common to observe that, in the process of adminstering a medication, a nurse taps a syringe multiple times (intermittenly) to remove air bubbles from the syringe. As such, the examiner asserts there is no novelty to the idea of striking a dispenser multiple times to remove air bubbles. To apply such a conventional process to a thermal or piezoelectric ejector would have been recognized by one of ordinary skill in the art as an obvious method of removing the air bubbles.

As to Group III, claim 4, appellant admits Ford does teach tapping/striking the dispenser to dislodge air bubbles. However, appellant asserts the teaching is vague and does not suggest a direction for applying the striking. The broad teaching of Ford encompasses applying the strike in any direction and does not preclude the striking from occurring in the same or parrallel direction to that of the direction of drop ejection. The direction or point of application may be dependent on how the dispenser is mounted or arranged. If a dispenser is mounted or held in a device in such a manner

which the sides are covered, it would be obvious to one ordinary skill in the art to strike to the dispenser in such a parallel direction.

As to Group IV, Claims 5-8, appellant argues that the combined teachings do not specify the striking occurs in a particular range of claims 5-6 and energy range of claims 7-8. The examiner asserts that the striking of the dispenser is a conventional routine. It would have been obvious to one of ordinary skill in the art, through routine experimentation, to determine the optimum energy (force) to apply to tap the dispenser at a rate and in an energy range which is not too hard nor too soft to allow the bubbles to be dislodged and coalesce without causing undue affects such as breaking or misaligning the dispensing device.

As to appellant's discussion of the action or means by which dispensing occurs, this issue is not germaine to the claims. The pending claims do not recite a thermal or piezoelectric tranducer is used to dispense fluid from the dispenser. While the claims are directed to a method of dispensing, the pending claims do not specify what element provides for the dispensing of drops from the device.

As to Group V, claims 11-14 and 39-42, appellant states that neither Ford nor Bares teach or suggest a method of fabricating arrays of chemical moieties. As admitted by appellant on page 2, lines 12-17 of the specification, such an application of pulse jet dispensers is "typical" well known. Furthermore as discussed above, microarray fabrication is well known in the art and the employment of numerous types of dispensers including inkjet, pulse-jet, thermoelectric, piezoelectric, plunger, syringe, etc.

are conventionally known as being means to dispense the fluid to fabricate such arrays (as evidenced by for example, Caren et al., US 6,872,359; Ellson et al. US 6,603,118).

As to Group VI, claims 35 and 36, appellant asserts that neither Ford nor Bares suggests the striking would improve pulse-jet firability. It is known that the presence of air bubbles in certain dispensing situations may be adverse to achieving the desired effects. Hence the need to remove the bubbles results in advantages to the dispensing process, which may include "improved firing ability". Furthermore, the silence of the references to mention the advantage of "improving firing ability" does not preclude the totality of teachings of those references for having such an affect.

For reasons given herein, the examiner asserts the rejections are properly applied.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Brian R. Gordon

Conferees:

Jill Warden

Patrick Ryan

Jill Warden
Supervisory Patent Examiner
Technology Center 1700

ROY KING
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700

for Ryan